



Model Curriculum

QP Name: Automotive Automation Specialist

QP Code: ASC/Q6807

QP Version: 2.0

NSQF Level: 6

Model Curriculum Version: 1.0

Automotive Skill Development Council, 153, Gr Floor, Okhla Industrial Area, Phase – III, Leela Building,
New Delhi – 110020

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Training Parameters

Sector	Automotive
Sub-Sector	Manufacturing
Occupation	Plant and Equipment Maintenance
Country	India
NSQF Level	6
Aligned to NCO/ISCO/ISIC Code	NCO-2015/7412.0101
Minimum Educational Qualification & Experience	10th Class + 2 years of ITI with minimum 6 years experience in Production/Maintenance/ Automation OR 10th Class + 1 years of ITI with minimum 7 years experience in Production/Maintenance/ Automation OR Diploma (Industrial/Electrical/Electronics Engineering) with minimum 5 Years of experience in Maintenance/Production/ Automation OR B.E./B.Tech (Industrial/Electrical/Electronics Engineering) with minimum 3 Years of experience
Pre-Requisite License or Training	
Minimum Job Entry Age	23 Years
Last Reviewed On	18/03/2021
Next Review Date	18/03/2026
NSQC Approval Date	27/05/2021
Version	2.0
Model Curriculum Creation Date	18/03/2021
Model Curriculum Valid Up to Date	18/03/2026
Model Curriculum Version	1.0
Minimum Duration of the Course	568 Hours, 0 Minutes
Maximum Duration of the Course	568 Hours, 0 Minutes

Program Overview

This section summarizes the end objectives of the program along with its duration.

Training Outcomes

After completing this programme, participants will be able to:

- Identify various equipment and machinery used in the maintenance of process control systems.
- Conduct repair and maintenance of process control systems.
- Perform the steps involved in procuring vendor and new systems
- Use 3D printing machine for the printing of automotive components.
- Work effectively and efficiently as per schedules and timelines.
- Implement safety practices.
- Use resources optimally to ensure less wastage and maximum conservation.
- Communicate effectively and develop interpersonal skills.

Compulsory Modules

The table lists the modules and their duration corresponding to the Compulsory NOS of the QP.

NOS and Module Details	Theory Duration	Practical Duration	On-the-Job Training Duration	On-the-Job Training Duration	Total Duration
Bridge Module	08:00	00:00			08:00
Module 1: Introduction to the role of an Automation Specialist	08:00	00:00			08:00
ASC/N9810: Manage work and resources (Manufacturing) NOS Version No. – 1.0 NSQF Level – 5	24:00	32:00	-	-	56:00
Module 2: Manage work and resources according to safety and conservation standards	24:00	32:00	-	-	56:00
ASC/N9812 – Interact effectively with team, customers and others NOS Version No. 1.0 NSQF Level 5	24:00	32:00	-	-	56:00
Module 3: Communicate effectively and efficiently	24:00	32:00	-	-	56:00

ASC/N6809 Repair and maintain the process control systems NOS Version No. 2.0 NSQF Level 6	60:00	88:00	-	-	148:00
Module 4: Repair & maintain the control systems	60:00	88:00			148:00
ASC/N6810 Plan and arrange installation of new systems NOS Version No. 2.0 NSQF Level 6	60:00	90:00	-	-	150:00
Module 5: Planning and arranging installation of new systems.	60:00	90:00			150:00
ASC/N6811 Select and operate 3D Printing machine for product generation NOS Version No. 2.0 NSQF Level 6	60:00	90:00	-	-	150:00
Module 6: Selecting and operating a 3D printing machine.	60:00	90:00			150:00
Total Duration	236:00	332:00	-	-	568:00

Module Details

Module 1: Introduction to the role of an Automation Specialist

Bridge module

Terminal Outcomes:

- Discuss the role and responsibilities of an Automation Specialist.

Duration: <08:00>	Duration: <00:00>
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • List the role and responsibilities of an Automation Specialist. • Discuss the job opportunities of an Automation Specialist. • Explain about Indian automotive manufacturing market. • List various automobile Original Equipment Manufacturers (OEMs) and different products/ models manufactured by them. • Identify the standard checklists and schedules recommended by OEM. • Discuss the need and importance of computerised systems and updated softwares in Automotive manufacturing process. 	
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	
Checklist	

Module 2: Manage work and resources according to safety and conservation standards

Mapped to ASC/N9810, v1.0

Terminal Outcomes:

- Employ appropriate ways to maintain safe and secure working environment.
- Apply material and energy conservation practices at the workplace.

Duration: <24:00>	Duration: <32:00>
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Discuss organisational procedures for health, safety and security and individual role and responsibilities related to the same. • List the potential workplace related risks, threats and hazards, their causes and preventions. • List personal protective equipment like safety gloves, glasses, shoes and mask used at the workplace. • List various types of fire extinguisher. • Identify various safety boards/ signs placed on the shop floor. • Explain 5S standards, procedures and policies followed at workplace. • Discuss organisational procedures to deal with emergencies and accidents at the workplace and importance of following them. • State the importance of conducting safety drills or training sessions. • Explain the process of filling daily check sheet for reporting to the concerned authorities about improvements done and risks identified. • Discuss how and when to report about potential hazards identified in the workplace and limits of responsibility for dealing with them. • Outline the importance of keeping workplace, equipment, restrooms etc. clean and sanitised. • Explain the importance of following hygiene and sanitation regulations developed by organisation at the workplace. • Discuss the importance of maintaining the availability of running water, hand wash 	<ul style="list-style-type: none"> • Apply appropriate ways to implement safety practices to ensure safety of people at the workplace. • Display the correct way of wearing and disposing PPE. • Demonstrate the use of fire extinguisher. • Demonstrate how to provide first aid procedure in case of emergencies. • Demonstrate how to evacuate the workplace in case of an emergency. • Employ various techniques for checking malfunctions in the machines with the support of maintenance team and as per Standard Operating Procedures (SOP). • Demonstrate to arrange tools/ equipment/ fasteners/ spare parts into proper trays, cabinets, lockers as mentioned in the 5S guidelines/work instructions. • Apply appropriate ways to organise safety drills or training sessions for others on the identified risks and safety practices. • Prepare a report about the health, safety and security breaches. • Apply appropriate ways to check that workplace, equipment, restrooms etc. are cleaned and sanitised. • Role play a situation to brief the team about the hygiene and sanitation regulations developed by organisation. • Demonstrate the correct way of washing hands using soap and water and alcohol-based hand rubs. • Explain methods to support the employees to cope with stress, anxiety etc. • Demonstrate proper waste collection and disposal mechanism depending upon types of waste.

<p>and alcohol-based sanitizers at the workplace.</p> <ul style="list-style-type: none"> • Discuss the significance of conforming to basic hygiene practices such as washing hands, using alcohol based hand sanitizers or soap. • Recall ways of reporting advanced hygiene and sanitation issues to the concerned authorities. • Elucidate various stress and anxiety management techniques and their. • Discuss the significance of greening. • Classify different categories of waste for the purpose of segregation. • Differentiate between recyclable and non-recyclable waste. • Discuss various methods of waste collection and disposal. • List the various materials used at the workplace. • Explain organisational recommended norms for storage of tools, equipment and material. • Discuss the importance of efficient utilisation of material and water. • Explain basics of electricity and prevalent energy efficient devices. • Explain the processes to optimize usage of material and energy/electricity. • Enlist common practices for conserving electricity at workplace. 	<ul style="list-style-type: none"> • Perform the steps involved in storage of tools, equipment and material after completion of work. • Employ appropriate ways to resolve malfunctioning (fumes/ sparks/ emission/ vibration/ noise) and lapse in maintenance of equipment as per requirements. • Perform the steps to prepare a sample material and energy audit reports. • Employ practices for efficient utilization of material and energy/electricity.
<p>Classroom Aids:</p>	
<p>Whiteboard, marker pen, projector</p>	
<p>Tools, Equipment and Other Requirements</p>	
<ul style="list-style-type: none"> • Housekeeping material: Cleaning agents, cleaning cloth, waste container, dust pan and brush set, liquid soap, hand towel, fire extinguisher • Safety gears: Safety shoes, ear plug, goggles, gloves, helmet, first-aid kit 	

Module 3: Communicate Effectively and Efficiently

Mapped to NOS ASC/N9812, v1.0

Terminal Outcomes:

- Use effective communication and interpersonal skills.
- Apply sensitivity while interacting with different genders and people with disabilities.

Duration: 24:00	Duration: 32:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> ● Explain the importance of complying with organizational requirements to share information with team members. ● Discuss the ways to adjust the communication styles to reflect sensitivity towards gender and persons with disability (PwD). ● Explain the importance of respecting personal space of colleagues and customers. ● Describe the ways to manage and coordinate with team members for work integration. ● State the importance of team goals over individual goals, keeping commitment made to team members, and informing them in case of delays. ● Discuss the importance of following the organisation’s policies and procedures ● Discuss the importance of rectifying errors as per feedback and minimizing mistakes. ● Discuss gender-based concepts, issues and legislation as well organization standards, guidelines, rights and duties of PwD. ● Discuss the importance of PwD and gender sensitization to ensure that team shows sensitivity towards them. ● State the importance of following organizational standards and guidelines related to PwD. ● Recall the rights and duties at workplace with respect to PwD. 	<ul style="list-style-type: none"> ● Employ different means and methods of communication depending upon the requirement to interact with the team members. ● Employ appropriate ways to maintain good relationships with team members and superiors. ● Apply appropriate techniques to resolve conflicts and manage team members for smooth workflow. ● Conduct training sessions to train the team members on proper reporting of completed work and receiving feedback. ● Employ suitable ways to escalate problems to superiors as and when required. ● Prepare a sample report on the progress and team performance . ● Role play a situation on how to offer help to people with disability (PwD) if required at work.

- Outline organisation policies and procedures pertaining to written and verbal communication.

Classroom Aids:

White board/black board marker/chalk, duster, computer or Laptop attached to LCD projector

Tools, Equipment and Other Requirements

Module 4: Repair and maintain the process control systems

Mapped to ASC/N6809, v2.0

Terminal Outcomes:

- Perform maintenance and repair of automotive manufacturing process control system.
- Prepare plans and schedules for the maintenance of system.
- Prepare various documents related to QMS, maintenance activities, procurement etc.

Duration: 60:00	Duration: 90:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Discuss company manufacturing processes and equipment in use. • List types of automotive systems being used and sequence of operations for each process. • Recall ways for inspecting the process control systems and in-process breakdown of systems. • List the steps to be performed for repairing the process control and automation systems and replacing the spare parts of the system. • List the steps to be performed for repairing the internal wiring condition, motherboard conditions, software/ hardware malfunctioning etc. and verifying their working condition after that. • Discuss appropriate ways to troubleshoot pneumatic, hydraulic, electrical control system elements. • List material handling equipment, tools, equipment, accessories, consumables and spare parts required during the maintenance work. • Explain the importance of checking that if software are installed and upgraded properly. • Discuss the importance of noting the duration of each task in improving scheduling and planning process. • List QMS requirements. • Discuss documents and records needed to be maintained related to spares stored in store-house, vendors in the system, history of the equipment for the PM/breakdown maintenance, QMC requirements etc. 	<ul style="list-style-type: none"> • Perform the steps to prepare a sample Project Management (PM) schedule for automotive manufacturing process control system • Apply appropriate ways to inspect the process control systems and in-process breakdown of systems. • Read electrical-wiring drawings of existing layout/ equipment/ systems. • Employ appropriate methods to check the electrical circuit continuity & joint's connections of the system. • Perform the steps to prepare a sample monthly plan for inspection of critical process control. • Employ appropriate ways for repairing the process control and automation systems, wiring condition, motherboard condition, software/hardware malfunctioning etc., replacing the spare parts of the system and verifying their working condition after that. • Show how to verify the automotive equipment condition and change the critical components in defined sequence. • Demonstrate the standard operating procedure to use material handling equipment, tools and equipment required during maintenance work. • Apply appropriate techniques to check if that software are installed and upgraded properly. • Role play a situation on how to co-ordinate with the vendors for procuring the system parts and an AMC for upkeep of the machines/systems/robots etc. • Perform the steps to prepare sample documents required for process control

<ul style="list-style-type: none"> Describe various problem solving techniques – TOPS 8D, 7 QC tools etc. 	<p>and automation as per the Quality Management System (QMS) requirements.</p>
<p>Classroom Aids:</p>	
<p>Laptop White board, Marker, Projector & stationary</p>	
<p>Tools, Equipment and Other Requirements</p>	
<p>PCs/Laptops, Internet with Wi-Fi (Min2 Mbps Dedicated) 18 documents of PPAP, Design records, Design Records, Authorized Engineering Change Documents, Customer Engineering Approval, Design Failure Modes and Effects Analysis (DFMEA), applied in special situations, Process Flow Diagram, Process Failure Modes and Effects Analysis (PFMEA) Control Plan, Part Submission Warrant (PSW), Engineering Change Documents Dimensional Results, PLC Simulator, Hydraulic, Pneumatic, Electronic Control Systems Simulator, Internet of Things study material and IOT communication devices, Manufacturing Execution system, manufacturing operation management system. Hydraulics and pneumatics systems simulator, PLC Simulator with required software, Air Cylinders, valves, connector/tubing simulators, Pick and place robots assembly Electronics sensor like proximity, optical, magnetic sensors.</p>	

Module 5: Plan and arrange for installation of new automation systems

Mapped to ASC/N6810, v2.0

Terminal Outcomes:

- Perform the steps of selecting and procuring the vendor.
- Demonstrate organisational procedure of new automotive system installation, conducting trial run for any issues etc.

Duration: 60:00	Duration: 90:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • List the sequence of operations for each process involved in installation of new automation systems. • List the types of systems used in the process. • Describe the installed process control and automation system. • Discuss various control requirements for planning a manufacturing process. • Explain how to operate electrical systems used in the process. • Summarise the procedure of operating and testing the PLC, SCADA & electrical elements. • Explain QMS system. • Recall the process of calculating the individual quantity of the automotive systems to be installed. • List protocol & standards for new system installation of the company. • Discuss the process of identifying and selecting vendor for procurement of the new system. • Explain the organisational specified policies and procedures for conducting trial run and suggesting improvements in the system to the vendor as per requirements. • List the documents needed to be prepared related to procurement, trial run and modifications done on the system. • Recall the steps to be performed for receiving and inspecting the components from vendor and then sending back the damaged components for replacement. • List the steps to be performed for installation of the new system. • Discuss countermeasures for abnormalities found in the functioning of system. 	<ul style="list-style-type: none"> • Employ appropriate ways for calculating the individual quantity of the automotive systems to be installed. • Prepare a plan of procurement and installation process of automotive systems. • Demonstrate organisational procedure for identifying and selecting vendor for procurement of the new system. • Employ appropriate ways for conducting trial and retrial run of the systems. • Prepare a report about the procurement, trial run and modifications done on the system to get necessary approvals from the management. • Employ appropriate ways to approve a P.O. and procure the system by following organisational procedures. • Apply appropriate ways for inspecting the components for any damage received from vendor. • Employ appropriate ways to send back the damaged component to vendor for replacement. • Demonstrate the installation of the new system at the pre-defined location. • Read layout of the processes and electrical wiring drawings of existing layout/equipment/systems. • Apply appropriate ways for conducting test run of the installed system for checking any abnormalities in its functioning. • Employ practices for implementing the countermeasures for correcting the abnormalities found in the functioning of system. • Role play a situation to report the management about progress of the system and request for a feedback.

<ul style="list-style-type: none"> • List the steps to be performed for trouble shooting & fault finding for all the systems. • Discuss how to document the information derived from coding & logic, circuit diagrams of the system received from vendor. • Discuss the records and documents needed to be prepared and maintained related to new system for the concerned authorities and departments. 	<ul style="list-style-type: none"> • Apply appropriate ways to inform the team about management feedback and resolving the issues based on it.
<p>Classroom Aids:</p>	
<p>Laptop White board, Marker, Projector & stationary</p>	
<p>Tools, Equipment and Other Requirements</p>	
<p>PCs/Laptops, Internet with Wi-Fi (Min2 Mbps Dedicated)</p> <p>18 documents of PPAP, Design records, Design Records, Authorized Engineering Change Documents, Customer Engineering Approval, Design Failure Modes and Effects Analysis (DFMEA), applied in special situations, Process Flow Diagram, Process Failure Modes and Effects Analysis (PFMEA) Control Plan, Part Submission Warrant (PSW), Engineering Change Documents Dimensional Results, PLC Simulator, Hydraulic, Pneumatic, Electronic Control Systems Simulator, Internet of Things study material and IOT communication devices, Manufacturing Execution system, manufacturing operation management system.</p> <p>Hydraulics and pneumatics systems simulator, PLC Simulator with required software, Air Cylinders, valves, connector/tubing simulators, Pick and place robots assembly</p> <p>Electronics sensor like proximity, optical, magnetic sensors.</p>	

Module 6: Operate 3D Printing machine for production

Mapped to ASC/N6811, v1.0

Terminal Outcomes:

- Identify raw material, machine, components and automotive parts involved in manufacturing process.
- Perform the steps to operate and set up the machine for printing the automotive components.
- Demonstrate post-processing activities like quality check, segregation, storage etc.

Duration: 60:00	Duration: 90:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Discuss manufacturing and automotive product design standards and procedures followed in the company. • Explain various 3D Printing technologies such as Fused Deposition Modelling, StereoLithography etc. • Identify various symbols and notifications being displayed by the 3D Printing machine. • Describe functionality of the 3D printing machine. • Discuss the importance of preserving critical electronic parts/equipment from moisture/ heat/ environmental external conditions. • List the machine, support structure, raw material etc. required for work. • List types of materials available for fabrication in various 3D printing technique. • Explain the selection criteria of raw material and 3D printing machine as per the product specifications. • Recall various specifications of machine such as build speed, extrusion speed, nozzle temperature etc. • List machine operating parameters such as room temperature range, air cleanliness. • List types of files such as .stl, code file, etc generated in the various steps of the process. • Explain standard tessellation language (.stl) code file and its selection criteria for machine operation. • List the steps to be performed for deleting unwanted code files, uploading new code 	<ul style="list-style-type: none"> • Demonstrate how to select the raw material and 3D printing machine for printing the automotive components as per product specifications. • Use appropriate resources to obtain information about part orientation, support structure requirement, machine specifications, machine operating parameters etc. as per the work requirement. • Show how to delete unwanted code files, upload new code files and select any pre-stored program in the machine memory. • Demonstrate how to connect the data storage devices with the machine. • Show how to check the number of automotive parts needed to be manufactured. • Role play a situation on how to co-ordinate with the designer for rectifying the errors generated during file uploading and observed during running of process. • Apply appropriate ways to check the critical components of machine. • Demonstrate how to set and clean the 3D printing machine before starting the printing operation by following organisational procedures. • Apply appropriate techniques to decipher the codes to calculate the volume of material • Show how to load appropriate amount of consumables material. • Show how to pre-heat the bed of the machine and set the laser or nozzles

<p>files and selecting any pre-stored program in the machine memory.</p> <ul style="list-style-type: none"> • Summarise the steps to be performed for checking the critical components of machine. • List steps for preparing 3D printing machine for operation. • List the steps to be performed for operating the 3D printing machine. • Describe post-processing techniques such as removing and cleaning fabricated parts, inspection, segregation etc. of parts. • Discuss ways for removing the fabricated part from machine and support structures from the part. • Explain methods of inspecting the quality and non-conformities of the part. • Discuss the process of segregating of damaged and ok parts as per organisational guidelines. • Discuss the process of storing of ok parts as per organisational guidelines. • Discuss the documents needed to be maintained related to work. 	<p>temperature of the machine to defined values.</p> <ul style="list-style-type: none"> • Demonstrate organizational specified procedure of operating the 3D printing machine for printing of automotive components. • Apply appropriate ways to identify and rectify errors in machine during the machine operation. • Show how to stop the machine during an unwanted situation. • Demonstrate how to remove the fabricated part and support structures from the machine carefully. • Apply appropriate ways to clean the part for getting required surface finish. • Apply appropriate inspection methods for checking the quality and non-conformities of the part. • Show how to segregate the parts into rework or reject as per organisational guidelines. • Demonstrate how to store the manufactured automotive parts as per organisational guidelines.
<p>Classroom Aids:</p>	
<p>Laptop White board, Marker, Projector & stationary</p>	
<p>Tools, Equipment and Other Requirements</p>	
<p>3D Printing machines- Fixed Deposition Modelling Machine, Stereo-Lithography Machine, Metal Sintering Machine & any other type of 3D printing machine with the all the consumables required. Flash Drive (With pre-stored program)</p>	

Annexure

Trainer Requirements

Trainer Prerequisites						
Minimum Educational Qualification	Specialization	Relevant Industry Experience		Training Experience		Remarks
		Years	Specialization	Years	Specialization	
Diploma	Mechanical/Automobile	4	Mechanical/Automobile	1	Mechanical/Automobile	NA
B.E./B. Tech	Mechanical/Automobile	3	Mechanical/Automobile	1	Mechanical/Automobile	NA
M.E / M.TECH	Mechanical/Automobile	2	Mechanical/Automobile	1	Mechanical/Automobile	NA

Trainer Certification	
Domain Certification	Platform Certification
“Automotive Automation Specialist, ASC/Q6807, version 2.0”. Minimum accepted score is 80%.	“Trainer; MEP/Q2601 v1.0” Minimum accepted score is 80%.

Assessor Requirements

Assessor Prerequisites						
Minimum Educational Qualification	Specialization	Relevant Industry Experience		Training Experience		Remarks
		Years	Specialization	Years	Specialization	
Diploma	Mechanical/Automobile	5	Mechanical/Automobile	1	Mechanical/Automobile	NA
B.E./B. Tech	Mechanical/Automobile	4	Mechanical/Automobile	1	Mechanical/Automobile	NA
M.E / M.TECH	Mechanical/Automobile	3	Mechanical/Automobile	1	Mechanical/Automobile	NA

Assessor Certification	
Domain Certification	Platform Certification
“Automotive Automation Specialist, ASC/Q6807, version 2.0”. Minimum accepted score is 80%.	“Assessor; MEP/Q2701 v1.0” Minimum accepted score is 80%.

Assessment Strategy

1. Assessment System Overview:

- Batches assigned to the assessment agencies for conducting the assessment on SDSM/SIP or email
- Assessment agencies send the assessment confirmation to VTP/TC looping SSC
- Assessment agency deploys the ToA certified Assessor for executing the assessment
- SSC monitors the assessment process & records

2. Testing Environment:

- Confirm that the centre is available at the same address as mentioned on SDMS or SIP
- Check the duration of the training.
- Check the Assessment Start and End time to be as 10 a.m. and 5 p.m.
- If the batch size is more than 30, then there should be 2 Assessors.
- Check that the allotted time to the candidates to complete Theory & Practical Assessment is correct.
- Check the mode of assessment—Online (TAB/Computer) or Offline (OMR/PP).
- Confirm the number of TABs on the ground are correct to execute the Assessment smoothly.
- Check the availability of the Lab Equipment for the particular Job Role.

3. Assessment Quality Assurance levels / Framework:

- Question papers created by the Subject Matter Experts (SME)
- Question papers created by the SME verified by the other subject Matter Experts
- Questions are mapped with NOS and PC
- Question papers are prepared considering that level 1 to 3 are for the unskilled & semi-skilled individuals, and level 4 and above are for the skilled, supervisor & higher management
- Assessor must be ToA certified & trainer must be ToT Certified
- Assessment agency must follow the assessment guidelines to conduct the assessment

4. Types of evidence or evidence-gathering protocol:

- Time-stamped & geotagged reporting of the assessor from assessment location
- Center photographs with signboards and scheme specific branding
- Biometric or manual attendance sheet (stamped by TP) of the trainees during the training period
- Time-stamped & geotagged assessment (Theory + Viva + Practical) photographs & videos

5. Method of verification or validation:

- Surprise visit to the assessment location
- Random audit of the batch
- Random audit of any candidate

6. Method for assessment documentation, archiving, and access

- Hard copies of the documents are stored
- Soft copies of the documents & photographs of the assessment are uploaded / accessed from Cloud Storage
- Soft copies of the documents & photographs of the assessment are stored in the Hard Drives

References

Glossary

Term	Description
Declarative Knowledge	Declarative knowledge refers to facts, concepts and principles that need to be known and/or understood in order to accomplish a task or to solve a problem.
Key Learning Outcome	Key learning outcome is the statement of what a learner needs to know, understand and be able to do in order to achieve the terminal outcomes. A set of key learning outcomes will make up the training outcomes. Training outcome is specified in terms of knowledge, understanding (theory) and skills (practical application).
OJT (M)	On-the-job training (Mandatory); trainees are mandated to complete specified hours of training on site
OJT (R)	On-the-job training (Recommended); trainees are recommended the specified hours of training on site
Procedural Knowledge	Procedural knowledge addresses how to do something, or how to perform a task. It is the ability to work, or produce a tangible work output by applying cognitive, affective or psychomotor skills.
Training Outcome	Training outcome is a statement of what a learner will know, understand and be able to do upon the completion of the training.
Terminal Outcome	Terminal outcome is a statement of what a learner will know, understand and be able to do upon the completion of a module. A set of terminal outcomes help to achieve the training outcome.

Acronyms and Abbreviations

NOS	National Occupational Standard(s)
NSQF	National Skills Qualifications Framework
QP	Qualifications Pack
TVET	Technical and Vocational Education and Training
AMC	Annual Maintenance Contract
PPE	Personal Protective Equipment
ERP	Enterprise Resource Planning
PM	Predictive Maintenance
QMS	Quality Management System
PLC	Programmable Logic Controller
SCADA	Supervisory Control And Data Acquisition
TOPS	Team Oriented Problem Solving
AMC	Annual Maintenance Contract
PPE	Personal Protective Equipment
ERP	Enterprise Resource Planning
PM	Predictive Maintenance
QMS	Quality Management System
PLC	Programmable Logic Controller
SCADA	Supervisory Control And Data Acquisition
TOPS	Team Oriented Problem Solving
HMI	Human Machine Interfaces
PLC	Programmable Logic Controller
SCADA	Supervisory Control And Data Acquisition
VFD	Variable Frequency Drive
HMI	Human Machine Interfaces
RFID	Radio Frequency Identification

QMS	Quality Management System
CFT	Complement Fixation Test